

## Relations industrielles Industrial Relations



# The Estimate of Productivity Growth in Canada's Prices and Incomes Policy

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Volume 32, numéro 1, 1977

URI : <https://id.erudit.org/iderudit/028768ar>

DOI : <https://doi.org/10.7202/028768ar>

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Éditeur(s)

Département des relations industrielles de l'Université Laval

ISSN

0034-379X (imprimé)

1703-8138 (numérique)

[Découvrir la revue](#)

Citer cet article

Ingerman, S. H. & Rose-Lizée, R. (1977). The Estimate of Productivity Growth in Canada's Prices and Incomes Policy. *Relations industrielles / Industrial Relations*, 32(1), 127–133. <https://doi.org/10.7202/028768ar>

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## COMMENTAIRES

### THE ESTIMATE OF PRODUCTIVITY GROWTH IN CANADA'S PRICES AND INCOMES POLICY

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A critical element in the determination of allowable increases in real compensation under the *Anti-Inflation Act Regulations* is the national productivity factor which has been set at two per cent for each guideline year (Anti-Inflation Board, 1975, section 47).<sup>1</sup> The national productivity factor, in conjunction with the basic protection factor and the experience adjustment factor, is supposed to provide workers with «a share in increases in national productivity» (Government of Canada, 1975a, 21).<sup>2</sup> The rationale for the 2 per cent figure is explained in the government's white paper as follows:

The standard amount provided for this in the initial period of the program is 2 per cent per annum. This compares with the average increase in productivity, defined as the real gross national product divided by the number of employed persons, of 2.08 per cent for the period 1954-74. (Government of Canada, 1975a, 21).

In the white paper, the government also states that the «guidelines are based on the principles proposed by the government in the consensus discussions... «tabled in the House of Commons on May 8, 1975 (Government of Canada, 1975a, 15). Another rationale presented by the government for the 2 per cent national productivity factor can be found in these discussions:

Over the past, real wages and labour productivity have grown at about the same rate (slightly over two per cent), ... (Government of Canada, 1975b, 2).

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<sup>1</sup> Hereafter references to sections of the *Anti-Inflation Act Regulations* (or the *Regulations*) will be given without citing the Anti-Inflation Board.

<sup>2</sup> The basic protection factor is designed to provide «a substantial degree of the protection that will be afforded to workers against price rises in the future.» (Government of Canada, 1975a, 20). Its purpose is to allow real compensation to increase more or less in step with the national productivity factor by protecting the increase from inflation. The experience adjustment factor is designed to provide average annual increases in real compensation equal to the national productivity factor over a period beginning two to three years prior to the adoption of controls and ending in October 1978.

In this note, it will be argued that:

- i) If a relationship is to be established between the rate of increase in labour compensation and the rate of growth of productivity, both must be measured in the same units. In other words, if it is real labour compensation per manhour which is to be regulated, as is the case in the *Regulations*, then the appropriate standard of comparison is output per manhour. Output per employed person is a correct measure of productivity only if it is labour compensation per employed person to which the *Regulations* apply.
- ii) There is a downward bias in the use of constant dollar gross national product as a measure of the rate of increase in real output.

For these two reasons, if previous performance is to be used as a criterion, the trend increase in real GNP per employed person for 1954-1974 (2.08 per cent) is an incorrect estimate of national productivity growth for Canada's prices and incomes policy. Furthermore, there is strong evidence that, in the past, real compensation advanced at a trend rate significantly above the two per cent figure cited by the government.

#### MEASURES OF LABOUR INPUT

The *Anti-Inflation Act Regulations* (Part 4) establish maximum permissible percentage rates of increase of *labour compensation per manhour* for groups of employees in the controlled sectors of the economy. A reasonable interpretation of these regulations is that, by controlling rates of increase of labour compensation, it will be possible to control unit labour costs and thereby the rate of increase of prices.

By definition:

$$\frac{\text{unit labour}}{\text{costs}} = \frac{\text{total labour costs}}{\text{output}}$$

Dividing both the numerator and the denominator on the right-hand side by a measure of labour input gives:

$$\begin{aligned} \frac{\text{unit labour}}{\text{costs}} &= \frac{\text{total labour costs}}{\text{employed persons}} \div \frac{\text{output}}{\text{employed persons}}, \text{or} \\ \frac{\text{unit labour}}{\text{costs}} &= \frac{\text{total labour costs}}{\text{manhours}} \div \frac{\text{output}}{\text{manhours}} \end{aligned}$$

From these definitional equations it is apparent that, if the unit of labour input used to divide total labour costs in manhours, then *manhours* — and not employed persons — should be used for the measurement of productivity growth.

There are three possible measures of manhours: manhour worked, manhours paid, and normal or standard hours of work. Again, the rule is that the same unit should be used in the denominators of both parts of the definition of unit labour costs.

Published measures of productivity use manhours worked as their unit of labour input.<sup>3</sup> To be comparable the *Regulations* should apply to total labour costs per manhour worked. In fact, they apply to total labour compensation per normal or standard hour of work (see paragraph 51 (1) (a), for example). To the extent that the proportion of hours worked at overtime rates remains the same, this will not cause any problem. Where there is a change in the number of overtime hours worked or the premium paid for these hours, employers are supposed to include the resulting additional cost in their calculation of the increase in total labour compensation. This provision will normally compensate for any divergence between the rate of increase of manhours worked and that of normal or standard hours of work.<sup>4</sup>

To some it may seem that the appropriate measure of manhours is that of manhours paid. However, the rule remains that the proper unit to be used in the measure of productivity is the same as that used in «labour costs per manhour.» In addition, it should be pointed out that changes in the ratio of manhours paid to manhours worked are also accounted for in the measure of total labour costs. Any increase in paid vacation or holiday time, coffee breaks, etc. must be calculated as an increase in total labour compensation per standard hour of work according to the *Anti-Inflation Act Regulations*.<sup>5</sup>

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<sup>3</sup> Data on manhours worked are collected through the Employment, Payrolls and Manhours Survey of establishments and cover only those enterprises employing 20 or more persons in the commercial sector of the economy. To our knowledge, this is the only source of a complete historical series of data on manhours worked for the Canadian economy. (See Statistics Canada, 14-201, 1946-1974). See also Statistics Canada, (72-507, section D) for a review of manhour concepts used in data collection by Statistics Canada.

In a special study prepared for the Economic Council of Canada, W. M. ILLING gives data on manhours worked for the entire economy for the period 1960-1970, but he gives no information on his source other than «data from Statistics Canada» (Illing, 1972, 229).

<sup>4</sup> See section 40 of the *Regulations* and Anti-Inflation Board (AI-14-C, 1976). Because a certain flexibility is allowed in the calculation of costs arising from changes in the number of overtime hours worked, there may be some divergence between the rate of growth of labour compensation per manhour worked and that of labour compensation per normal or standard hour. However, this divergence is likely to be small and may be either positive or negative.

<sup>5</sup> Section 50 of the *Regulations* specify that the hourly compensation for a group is to be calculated by adding the «straight time average hourly rate,» the «average hourly benefit rate,» the «average hourly direct incentive rate» and the «average hourly indirect incentive rate.» Other sections indicate that this definition of compensation includes almost all elements of labour costs. (In particular, see schedules B and C. In a later bulletin the numbers of these schedules were changed to 2 and 3, Errata 23-12-75).

The use of employed persons in estimating «the average increase in productivity» yields a substantially lower «national productivity factor» than would an estimate using manhours worked. Since the Second World War, the average annual rate of increase of manhours worked, in those sectors for which data is available, has been lower by 0.7 to 1.0 percentage points than the average annual rate of increase of persons employed.<sup>6</sup> It follows that measures of rates of growth of productivity which use manhours in the denominator will be higher by a similar amount than those measures which use employed persons in the denominator.

#### MEASURES OF OUTPUT

The government has used real gross national product for the entire economy as its measure of output in estimating the rate of growth of productivity. This measure has been criticized on the grounds that it tends to underestimate the rate of growth of productivity in the non-commercial sector.<sup>7</sup>

In the non-commercial sector (highway and bridge maintenance, water systems and other utilities, education and related services, hospitals, welfare organizations, religious organizations, private households, public administration and defence), the absence of a conventionally determined measure of production makes it difficult to measure output in constant prices. For those parts of gross national expenditure originating in the non-commercial sector which are composed of wages and salaries, national income accountants measure changes in the volume of output essentially by changes in the number of employees. In other words, output per worker is assumed to remain constant. A similar method is used in the construction industry where output is also difficult to measure because of its heterogeneity (Statistics Canada, 13-549E, 1975, 274-275).

In its *Third Annual Review*, the Economic Council of Canada estimated that because of this problem of measurement in the non-commercial sector and in the construction industry, «the amount of upward bias which the implicit Gross National Product price deflator currently contains could be of the order of 0.5 per cent per year.» (Economic Council of Canada, 1966, 86). The rate of growth of real GNP, and therefore of productivity measures which use this measure of output, would be underestimated by a similar amount.

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<sup>6</sup> Calculations for the commercial sector are based on data found in Statistics Canada (14-201, 1946-1974, Table 1) and for the whole economy on data from Illing (1972, 226 and 229).

<sup>7</sup> BERLINGUETTE and LEACY (1961, 209), BERMAN (1962, 59) and the Prices and Incomes Commission (1972, 27) have suggested using real domestic product of commercial industries or of commercial non-agricultural industries as an alternative to real gross national product for aggregate productivity estimates. These alternatives are less than satisfactory because of the growing importance of non-commercial sector output in total output.

## APPROPRIATE MEASURES OF PRODUCTIVITY GROWTH

Since, as demonstrated above, the *Anti-Inflation Act Regulations* apply to total labour compensation per manhour, an appropriate measure of productivity must also use manhours in the denominator. As can be seen from Table 1, a better figure for this would be about 3.3 per cent, the rate of growth of constant dollar gross national product per manhour for the period 1960-1970. If, in addition, the possible downward bias of 0.5 per cent inherent in this figure is taken into consideration, the appropriate figure would be about 3.8 per cent. In the commercial sector, the rate of growth of real domestic product per manhour worked has been slightly higher.

## PAST GROWTH OF REAL LABOUR COMPENSATION

We were unable to find any measure of the rate of increase of real total labour compensation or real wages for the economy as a whole.<sup>8</sup> In the commercial sector, which includes 80 to 85 per cent of economic output, real compensation per manhour has been growing at a rate of 3.6 to 3.9 per cent during the postwar period (Table 1). This figure is considerably higher than either the «slightly over two per cent» figure cited in the consensus discussions or the two per cent «national productivity factor» specified in the *Regulations*.

## Average Annual Rates of Growth of Selected Measures of Productivity and of Real Compensation per Unit of Labour Input for Selected Postwar Periods

	1946-74	1954-74	1960-70
<i>Total economy</i>			
Gross national product (constant 1961 dollars) per employed person	2.4%	2.2%	2.3% <sup>a</sup>
Real domestic product per employed person	2.5%	2.3%	2.3%
Real compensation per employed person	n.a.	n.a.	n.a.
Gross national product (constant 1961 dollars) per manhour worked	n.a.	n.a.	3.3%

<sup>8</sup> No source is given in the consensus discussions for this figure. Data on labour compensation, like data for manhours, are collected through the Employment, Payrolls, and Manhours Survey and are therefore available for the commercial sector only (see footnote 5).

ILLING presents data on «earnings per manhour» for the entire economy for 1960-1970, citing as his source «data from Statistics Canada» (Illing, 1972, 234). It should be noted, however, that labour compensation includes fringe benefits in addition to earnings. The estimate of the rate of increase of real earnings per manhour of 4.3 per cent calculated from Illing's data seems unusually high (see Table 1) even though, during the period 1960-1970, the rate of increase of total labour compensation would presumably be higher than that of earnings alone.

Real domestic product per manhour worked	n.a.	n.a.	3.2%
Real earnings <sup>b</sup> per manhour	n.a.	n.a.	4.3%

*Commercial industries*

Real domestic product per person employed	3.3%	3.3%	3.3% <sup>a</sup>
Real compensation <sup>b</sup> per person employed	3.1%	3.0%	2.8%
Real domestic product per manhour worked	4.1%	4.0%	4.2% <sup>a</sup>
Real compensation <sup>b</sup> per manhour worked	3.9%	3.7%	3.6%

Notes: (a) Illing (1972, 231) gives slightly different figures for some of these measures of productivity. For RDP in the commercial sector per person employed he gives 2.9%; for RDP in the commercial sector per manhour, he gives 3.8%; for total GNP per employed person he gives 2.4%.

B) Money compensation or earnings are deflated by the consumer price index. During the period 1946-1974 the CPI grew at an average annual rate of 3.7% compared to 4.1% for the implicit price deflator of gross national expenditure.

Sources: *Total economy* — Rates of growth of output per employed person are calculated from data published in Statistics Canada, *Canadian Statistical Review*. Rates of growth of output and earnings per manhour are taken from Illing (1972, 231 and 234).

*Commercial industries* — Rates of growth are calculated from data given in Statistics Canada (14-201, 1946-1974, Table 1).

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## The Paradox of Unemployment and Job Vacancies: a Comment

Frank REID

In a recent paper in this journal Skolnik and Siddiqui attempt to explain the paradox that in 1974 the Ontario labour market was characterized by high rates of both unemployment ( $u$ ) and job vacancies ( $v$ ). It is a paradox in the sense that normally there is an inverse relation between unemployment and vacancy rates — recessions being characterized by high unemployment rates and low vacancy rates, and boom periods the converse.<sup>2</sup>

The general approach taken by Skolnik and Siddiqui in analyzing the paradox is commendable — several hypotheses are considered as possible explanations and the alternative hypotheses are systematically subjected to empirical testing. In this note, however, I wish to take issue with the conclusions drawn by Skolnik and Siddiqui because of the specific way in which the hypotheses were tested.

The four hypotheses which Skolnik and Siddiqui consider are:

1. High vacancy rates exist only in a few labour markets and on this basis it has incorrectly been concluded that the labour market as a whole is characterized by a high vacancy rate.

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<sup>1</sup> SKOLNIK, M. L. and SIDDIQUI, F. «The Paradox of Unemployment and Job Vacancies: Some Theories Confronted by Data» *Relations industrielles/Industrial Relations*, vol. 31, no 1, pp. 32-55.

<sup>2</sup> See, for example, HANSEN (1970) for a discussion of the economic theory of the relation between unemployment and vacancy rates.